

CLAIM AMENDMENTS

1. (Currently Amended) A method for forming an underlayer film for copper, ~~characterized by comprising a process of bringing an underlayer film-forming material for copper including a compound represented by the following general formula [I] into contact with a surface of a substrate;~~

~~General formula [I]~~



wherein

at least one of X_1 , X_2 , and X_3 represents a hydrolysable group;

R_1 and R_2 each represent an alkyl group;

R represents a divalent linear organic group ~~which is formed~~ selected from the group consisting of an alkylene group, an aromatic ring, or and an alkylene group including an aromatic ring; and

n ~~represents~~ is an integer of from 1 to 6.

2. (Currently Amended) ~~A The method for forming an underlayer film for copper according to claim 1, characterized in that the underlayer film for copper is formed such that wherein the $(R_1R_2)P-(R)_n-Si$ group thereof bonds to the substrate via a an Si-O bond, and the underlayer film for copper is formed by a reaction between -OH on the surface of the substrate and $-Si(X_1X_2X_3)$ in a liquid phase.~~

3. (Currently Amended) ~~A The method for forming an underlayer film for copper according to claim 1, characterized in that the underlayer film for copper is formed such that wherein the $(R_1R_2)P-(R)_n-Si$ group thereof bonds to the substrate via a an Si-O bond, and the underlayer film for copper is formed by a reaction in a gas phase between -OH on the surface of the substrate and $-Si(X_1X_2X_3)$.~~

4. (Currently Amended) ~~A The method for forming an underlayer film for copper according to claim 1, characterized in that the underlayer film for copper is formed such that wherein the $(R_1R_2)P-(R)_n-Si$ group thereof bonds to the substrate via a an Si-O bond, and the underlayer film for copper is formed by a reaction in a supercritical fluid between -OH on the surface of the substrate and $-Si(X_1X_2X_3)$.~~

5. (Currently Amended) ~~A The method for forming an underlayer film for copper according to claim 12, characterized in that wherein the reaction between -OH on the surface~~

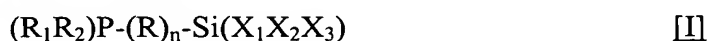
of the substrate and $-\text{Si}(\text{X}_1\text{X}_2\text{X}_3)$ is carried out at a temperature of room temperature to 450°C .

6. (Currently Amended) ~~A~~ The method for forming an underlayer film for copper according to claim ~~1~~ 2, ~~characterized by further comprising a process of including~~ removing by-product(s) produced in the reaction between $-\text{OH}$ on the surface of the substrate and $-\text{Si}(\text{X}_1\text{X}_2\text{X}_3)$.

7. (Currently Amended) An underlayer film for copper ~~arranged, disposed~~ on a substrate, ~~characterized in that~~ wherein the film is formed such that a $(\text{R}_1\text{R}_2)\text{P}-(\text{R})_n\text{-Si}$ group bonds to ~~a~~ the substrate via ~~a~~ an Si-O bond, ~~wherein~~ R_1 and R_2 each represent an alkyl group, R represents a divalent linear organic group ~~formed~~ selected from the group consisting of an alkylene group, an aromatic ring, ~~or~~ and an alkylene group including an aromatic ring, and ~~n~~ represents is an integer ~~of~~ from 1 to 6.

8. (Currently Amended) An underlayer film for copper according to claim 7, ~~characterized in that~~ wherein the film is formed by a method ~~for forming an underlayer film for copper~~ including ~~a process of~~ bringing an underlayer film-forming material for copper, including a compound represented by the following ~~general~~ formula [I] into contact with a surface of a substrate,

~~General formula [I]~~



wherein

at least one of X_1 , X_2 , and X_3 represents a hydrolysable group;

R_1 and R_2 each represent an alkyl group;

R represents a divalent linear organic group ~~which is formed~~ selected from the group consisting of an alkylene group, an aromatic ring, ~~or~~ and an alkylene group including an aromatic ring; and

n represents an integer ~~of~~ from 1 to 6.

9. (Currently Amended) A semiconductor device comprising:
a substrate;
an underlayer film for copper arranged on the substrate; and
a wiring film ~~made up, mainly of copper,~~ and arranged on the underlayer film for copper, wherein

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the underlayer film for copper is formed ~~such~~ so that ~~a~~ an $(R_1R_2)P-(R)_n$ -Si group bonds to a substrate via ~~a~~ an Si-O bond, ~~wherein~~ wherein R_1 and R_2 each represent an alkyl group;

R represents a divalent linear organic group ~~formed~~ selected from the group consisting of an alkylene group, an aromatic ring, ~~or~~ and an alkylene group including an aromatic ring; and

n ~~represents~~ is an integer ~~of~~ from 1 to 6.